

Claims

- [c1] 1. A method of forming a polysilicon film of a thin film transistor, comprising:
providing a substrate;
forming an amorphous silicon layer over the substrate;
forming a first optical layer on the amorphous silicon layer, wherein the first optical layer is comprised of a first region having a first thickness and a second region having a second thickness, and a reflectivity of the first region is higher than a reflectivity of the second region;
performing a laser annealing to transform at least a portion of the amorphous silicon layer into a molten silicon layer; and
crystallizing the molten silicon layer to form a polysilicon film.
- [c2] 2. The method of forming polysilicon film of claim 1, wherein the step of forming the optical layer comprising the first region and the second region further comprises:
forming an optical material layer on the amorphous silicon layer, wherein the optical material layer has a first thickness;
forming a patterned mask layer on the optical material

layer; and

etching a portion of the first optical material layer using the patterned mask layer as a mask until the etched portion of the first optical material layer reaches a second thickness.

- [c3] 3. The method of forming polysilicon film of claim 2, wherein the step of etching the optical material layer comprises an anisotropic etching process.
- [c4] 4. The method of forming polysilicon film of claim 1, wherein the step of crystallization of the molten silicon layer is performed by reducing temperature thereof.
- [c5] 5. The method of forming polysilicon film of claim 1, wherein the material of the first optical layer is selected from a group consisting of silicon nitride and silicon oxide.
- [c6] 6. The method of forming polysilicon film of claim 1, further comprising forming an isolation layer between the substrate and the amorphous silicon layer.
- [c7] 7. The method of forming polysilicon film of claim 1, wherein the reflectivity of the first optical layer having the first thickness exhibit a maximum reflectivity to the laser.

- [c8] 8. The method of forming polysilicon film of claim 1, wherein the reflectivity of the first optical layer having the second thickness exhibit a minimum reflectivity to the laser.
- [c9] 9. A method of forming polysilicon film, the method comprising:
providing a substrate;
forming an amorphous silicon layer over the substrate;
forming a first optical layer having a first thickness and a second optical layer having a second thickness on the amorphous silicon layer, wherein a reflectivity of the first optical layer having the first thickness is higher than a reflectivity of the second optical layer having the second thickness;
performing a laser annealing to transform at least a portion of the amorphous silicon layer into a molten silicon layer; and
crystallizing the molten silicon layer.
- [c10] 10. The method of forming polysilicon film of claim 9, wherein the step of crystallizing the molten silicon layer is performed by reducing temperature thereof.
- [c11] 11. The method of forming polysilicon film of claim 9, wherein the materials of the first optical layer and the second optical layer are selected from a group consisting

of silicon nitride and silicon oxide.

- [c12] 12. The method of forming polysilicon film of claim 9, further comprising forming an isolation layer between the substrate and the amorphous silicon layer.
- [c13] 13. The method of forming polysilicon film of claim 9, wherein the first optical layer exhibit a maximum reflectivity to the laser.
- [c14] 14. The method of forming polysilicon film of claim 9, wherein the second optical layer exhibit a minimum reflectivity to the laser.